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F2C 1C3B3 1C3B5 1C9A1B 1C9B1 1E7

F2L 5M3 5M5 5Q2

(19)

(54) MASSAGING MACHINE

(71) I, NICHIMU INADA, a Japanese citizen, of 4—25 Morofuku, 5-chome, Daito-shi, Osaka, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a massaging machine for the human body in repose and more particularly to an electrically driven massaging machine for use on the musculature of the human back.

Accordingly I provide a massaging machine comprising an inner frame carried within an outer fixedly slidable frame, the inner frame being pivoted in the outer frame, at least one cranked cantilever support arm having at its free end a massage element and supported at its other end by said inner frame, means for selectively repetitively moving said supported end in an oscillatory motion in one plane and/or an oscillatory motion in a plane substantially transverse to said one plane to cause said free end of said cantilever support arm and its massage element to make movements that are magnified in relation to said oscillatory motion or motions at said supported end of said cantilever support arm.

In the massaging machine of the present invention the massaging action is preferably carried out by means of a pair or a plurality of pairs of massage elements such as massage balls which protrude from the back of a chair, that is to say protrude inwardly towards the human body when in repose and seated in the said chair. Therapy to the musculature of the back of the body is given by means of the said massage balls, not only by setting up a repetitive oscillatory massaging movement in said balls in a conventional massaging manner but also if desired in a repetitive oscillatory pummelling massage movement in order to massage thoroughly the shoulders, the back, the waist, and indeed other parts of the body, and thereby facilitate the circulation of the blood and relieve any stiffness inter alia in the musculature of the patient's body.

The present invention will be more fully understood from the following description given by way of example only of a massaging machine shown in the Figures of the accompanying drawings wherein:—

Figure 1 is a front elevation showing the mechanism of the massage machine.

Figure 1A is a scrap view in oblique perspective and

Figure 1B is a detail of the supported end of one arm.

Figure 2 is a view in plan of Figure 1, enlarged;

Figure 3 is a side elevation of the machine of Figure 1, partly sectioned, showing the mechanism;

Figure 4 is a schematic showing graphically the directions of movement of the massage balls;

Figure 5 is a side elevation of a chair, with the massaging machine mounted therein;

Figure 6 is a side elevation, partly sectioned, of an alternative mechanism wherein a single motor achieves two distinct massaging movements by means of a pair of clutches.

Referring now specifically to the Figures of the drawings, an inner frame 4 is supported by means of pins 5 on the inside of the sides of an outer frame 3 about which it rocks to produce a pummelling repetitive oscillatory massaging movements of massage elements 6. The outer frame 3 is supported so as to be adjustable in relation to the back of a human body in repose and to be moved up and down along a substantially vertically disposed threaded shaft 1 (Figure 1, Figure 5) and two guides 2 which are substantially vertically mounted within the back C_B of a chair shown generally at C.

Referring now to Figures 2 and 3, two part bases 8, 8A are provided for each of two cranked cantilever support arms 7, having the form of a swan's neck or a letter Z with the central portion long in comparison with the two ends, said two part bases are

supported upon said inner frame 4 by means of pins 9, and said two part bases 8, 8A are bolted together by bolts 8_1. Housings 11_A, 11_B each connected to a crank shaft 13 and provided with eccentric cams 12 are coupled to their individual two part bases 8, 8A via coupling pins 11_{A_1} 11_{B_1} (Figures 1A and 2). Each housing 11_A, 11_B incorporates a self-aligning ball bearing 10. Said crank shaft 13 is journalled in a front plate 14 and a back plate 15 of outer frame 3 by means of bearings 13_A, 13_B and is connected to a motor 17 through a belt 16 and a pulley 16_A fitted to said crank shaft 13. Rotation of the shaft 17_A of the motor 17 causes the crank shaft 13 to move the supported ends (at 8, 8_A) of the two cantilever support arms 7 connected thereto in a substantially vertical plane via housings 11_A, 11_B pins 11_{A_1}, 11_{B_1}, bases 8, 8A pins 9 and inner frame 4; the axis of movement being about pin 9 which is in a substantially horizontal plane. The cranked cantilever support arms 7 are each provided at their free ends remote from the ends in the two part bases 8, 8A with a massage element or ball 6 and clearly the said massaging vibration is transmitted to the balls and magnified by the length of the cantilever support arm 7. The oscillatory motion of the bases derived from crank 13 and cam 12 is from side to side in a substantially horizontal direction but in a substantially vertical plane as illustrated by double header arrows '*a*' in Figure 4. The *modus operandi* of this substantially horizontal action in a vertical plane is seen from Figures 1A, 1B. As the eccentric cam 12 rotates so the housing 11A for example is made to move pin 11_{A_1} about pin 9 through a small arc (Figure 1B) to give the direction of double headed arrow *a*.

A cam shaft 18 is also journalled in the front plate 14 and the back plate 15 of the outer frame 3 by means respectively of bearings 18_A and 18_B. A ball bearing 19 is journalled on an extension shaft portion 18_1 of cam shaft 18 and bearing 19 is eccentrically placed on the extension shaft portion 18_1 to give a cam action. A self-aligning bearing 20 is connected in a link 21 that is able to be driven from a second motor 23 through a pulley 22. Thus, when the cam shaft 18 rotates as a result of the motor 23 being energized, the link 21 is moved in an oscillatory manner to and fro, that is to say in an up and down direction in a substantially vertical plane about an axis 5, 5 in a substantially horizontal plane, (in the direction of double headed arrow *b* in Figure 4). Consequently, the inner frame 4, which is connected to one end of said link 21 via a pin 20_A and lugs 4_A, 4_B on said inner frame 4 is rocked about pins 5 in relation to the outer frame 3, the pins 5 acting as a fulcrum within the limits of the tolerance of the self-aligning ball bearings 10 inside the housings 11 connected to the crank shaft 13. The cantilever support arms 7 connected to the inner frame 4 thereby causing the downward movements, thereby causing the massage balls 6 on the uppermost ends, that is to say the ends toward the body to be massaged, of the arms 7 to make repetitious substantially vertical pummelling massaging movements in the directions of double headed arrow '*b*' in Figure 4. Hole H in plate 15 has a larger diameter than that of shaft 13, similarly holes H_1, H_{11} in frame 4 have a larger diameter than shaft 13.

As is apparent from the foregoing, the described embodiment provides an electrically driven massaging machine in which the massage balls connected to the crank shaft are adapted to make repetitiously both an oscillatory massaging movement in one direction and an oscillatory pummelling massaging movement in a direction transverse to said one direction within the same structure, said massaging movements being obtained by rotating one of the two motors to turn the crank shaft connected thereto, and by the other motor rotating the crank shaft to rock the inner frame in relation to the outer frame by the use of the above-mentioned linking means, said inner frame being connected to said linking means. In this way the two rotors may be alternatively turned on and off by means of a switch mounted on the arm of the chair, so that a patient who uses this massaging machine can choose the massaging movements separately or in combination.

The operation of the electrically driven massaging machine of the present invention will now be described.

Firstly, when the substantially horizontal massaging movement is desired for the therapy, the rotation of the motor 17 is transmitted to the crank shaft 13 through the belt 16 and the pulley 16_A and the substantially horizontal oscillatory movement of the housings 11 is caused by the eccentric cams 12 rotating with said crank shaft 13. This is transmitted to the bases 8 of the cantilever support arms 7 connected to said housings 11 and inner frame 4, thereby allowing the massage balls 6 fitted to the tips of said arms repetitively to give a massaging action in the substantially horizontal direction as illustrated by the arrows '*a*' in Figure 1B and Figure 4. The massage balls 6 can be adjusted in their height to any position of the musculature of the back of the body of the patient that is to be massaged by energizing the third motor 24, mounted at the bottom of the massager, so that the rotation of the threaded shaft 1 freely moves the

outer frame 3 upwards and downwards along the guides 2.

Secondly, when simultaneous repetitious horizontal and repetitious pummelling vertical massaging movements are required, the second motor 23 is energized to rotate eccentrically the cam shaft 18. The eccentric rotation of said cam shaft 18 oscillates the link 21 to and fro, that is to say upwards and downwards of the chair in a substantially vertical direction and at the same time the inner frame 4 rocks about pins 5 in outer frame 3, said inner frame 4 being connected to the said link 21 via the pin 20_A and twin lugs 4_A, 4_B integral with the inner frame 4, said lugs passing through slots 14_A, 14_B in plate 14 of the outer frame 3, (see Figs. 1, 2). The pins 5 act as a fulcrum, thereby causing the bases 8 connected with the inner frame 4 to rock and to give to the arms 7 an upwards and downwards movement to produce a repetitious substantially vertical pummelling massaging movement, that is to say a repetitious movement of the massage balls 6 on the tips of the arms in the direction of the double headed arrow '*b*' shown in Figure 4.

A single motor can achieve both the above mentioned repetitious massaging movements by bringing an arm 27_A of a T-shaped lever 27 (Figure 6) upwards and downwards by means of a cable 28 so that two clutches 26_1, 26_{11} connected to said lever 27 are alternatively engaged and separately driven from pulleys 29 and 30 respectively, said clutches 26 being actuated by means of plate springs 25. Pulleys 29, 30 drive respectively shafts 18 and 13 via keys 18*k*, 13*k*.

As described above, the massaging machine of the present invention is characterized by the capability of continuing either the horizontal massaging movement or the vertical massaging pummelling movement at the option of the used by means of the same massage balls. In order to relieve the stiffness of *inter alia* the musculature of the back of the human body, the horizontal massaging therapy alone or the vertical pummelling massaging therapy alone may not be sufficient according to the degree of stiffness, and both of them may need to be used simultaneously and repeatedly for the purpose of having a speedy therapeutical effect upon the said stiffness. In the massaging machine of the present invention, the above-mentioned two kinds of movement can be easily accomplished in a single unit at the option of the user and by the user *per se* without using a second machine or changing component parts as is necessary in conventional massaging machines.

WHAT I CLAIM IS:—

1. A massaging machine comprising an inner frame carried within an outer fixedly slidable frame, the inner frame being pivoted in the outer frame, at least one cranked cantilever support arm having at its free end a massage element and supported at its other end by said inner frame, means for selectively repetitively moving said supported end in an oscillatory motion in one plane and/or an oscillatory motion in a plane substantially transverse to said one plane to cause said free end of said cantilever support arm and its massage element to make movements that are magnified in relation to said oscillatory motion or motions at said supported end.

2. The massaging machine according to claim 1 wherein the cranked cantilever support arm has the form of a letter Z or swan's neck with the centre portion thereof long in comparison with the end portions.

3. The massage machine according to claim 1 or claim 2 wherein the inner frame is supported at the sides of the outer frame by means of pins so that said inner frame is rockably displaceable relatively to said outer frame, said outer frame being held on a threaded shaft and guides so that it can be moved to and fro.

4. The massage machine according to claim 3, wherein the inner frame is connected with a crank shaft connected to a base of the/or each cantilever support arm by means of housings containing self-aligning ball bearings, said crank shaft being fitted with eccentric cams and being journalled in front and back plates of the outer frame, said crank shaft being driven by a motor through a transmitting means thereby to rotate said eccentric cams the or each of said support arms being thereby vibrated and causing the associated massage element on the end of the or each support arm to make repetitive oscillatory massage movements.

5. The massage machine according to claim 4, wherein a cam shaft is journalled in the outer frame and is connected to a second motor through a rotational transmitting means there being a link between the cam shaft and the inner frame, said cam shaft being rotated as a result of the second motor being driven to vibrate said link to and fro, the inner frame being vibrated thereby in relation to the outer frame, pins serving as a fulcrum for the vibrational movement between the said inner and outer frames at the sides of the said frames, and the cantilever support arm connected to said inner frame being thereby vibrated and causing the said massage element on the end of the support arm to make repetitive oscillatory pummelling movements.

6. The massage machine according to claim 5 wherein either the crank shaft or the cam shaft is driven independently by switching means.

7. The massage machine according to

claim 1 or 2 wherein a single motor provides both the oscillatory massage and pummelling movements of the massage element by means of a lever and a cable so that two clutches connected to said lever are alternatively engaged with separate pulleys, said pulleys being pressed by means of plate springs.

8. The massage machine according to any preceding claim wherein the machine is in a chair and two massage elements protrude from the back of the chair inwardly thereof.

9. The massage machine according to claim 8 wherein to adjust the height of the massage elements protruding from the back of the chair so that said elements may be juxtaposed with the musculature of the back of the human body, a motor mounted at the bottom of the chair is able to be energized to move the said outer frame together with the said massage elements.

10. The massage machine according to any preceding claim wherein each massage element is a ball.

11. A massage machine constructed and arranged substantially as herein described with reference to, and as illustrated in, the figures of the accompanying drawings.

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1400473 COMPLETE SPECIFICATION

6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

FIG.1.

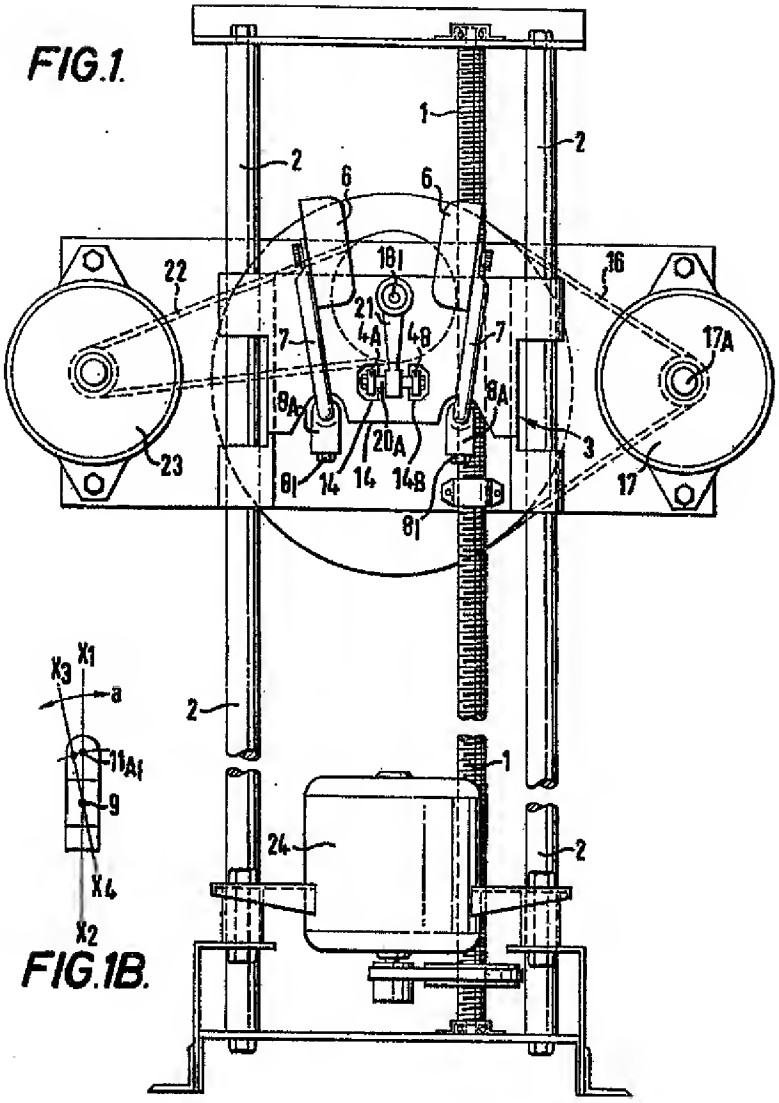


FIG.1B.

1400473 COMPLETE SPECIFICATION
6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

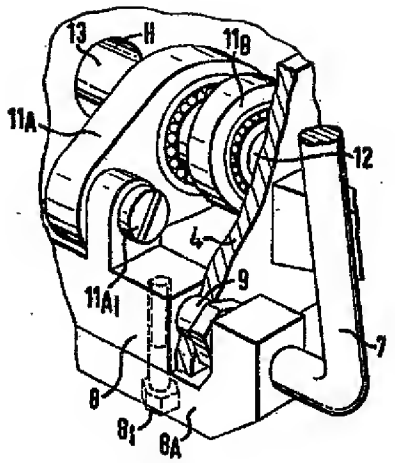
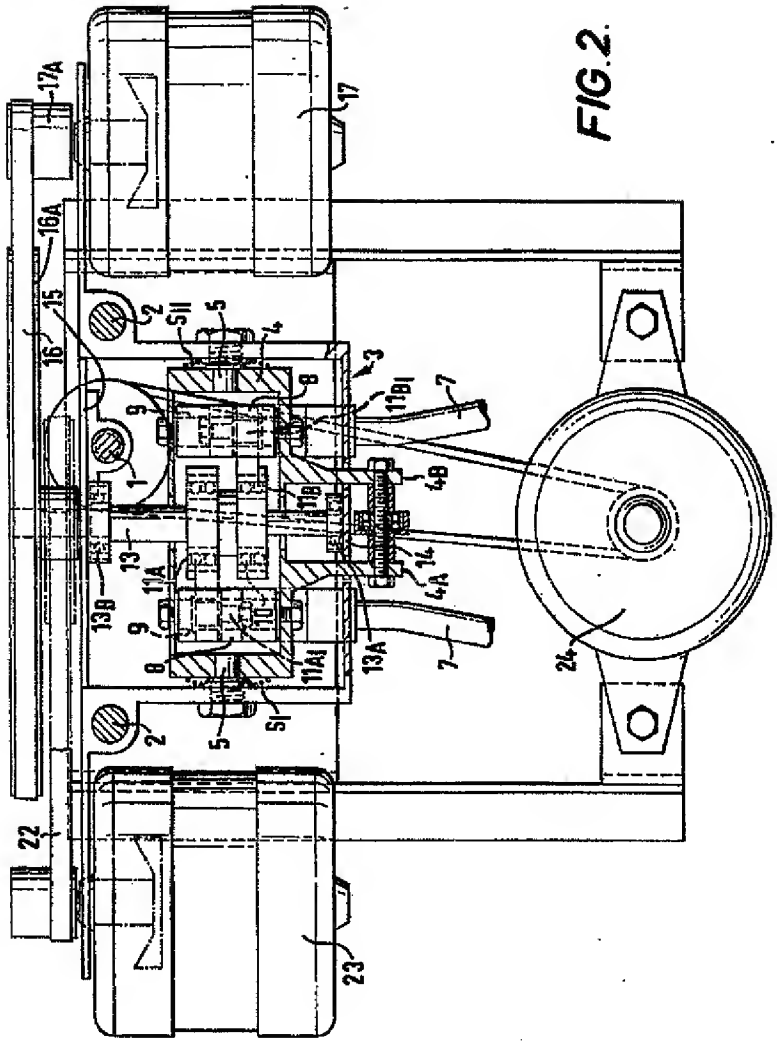


FIG.1A.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11BI
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1
4B
11B
13
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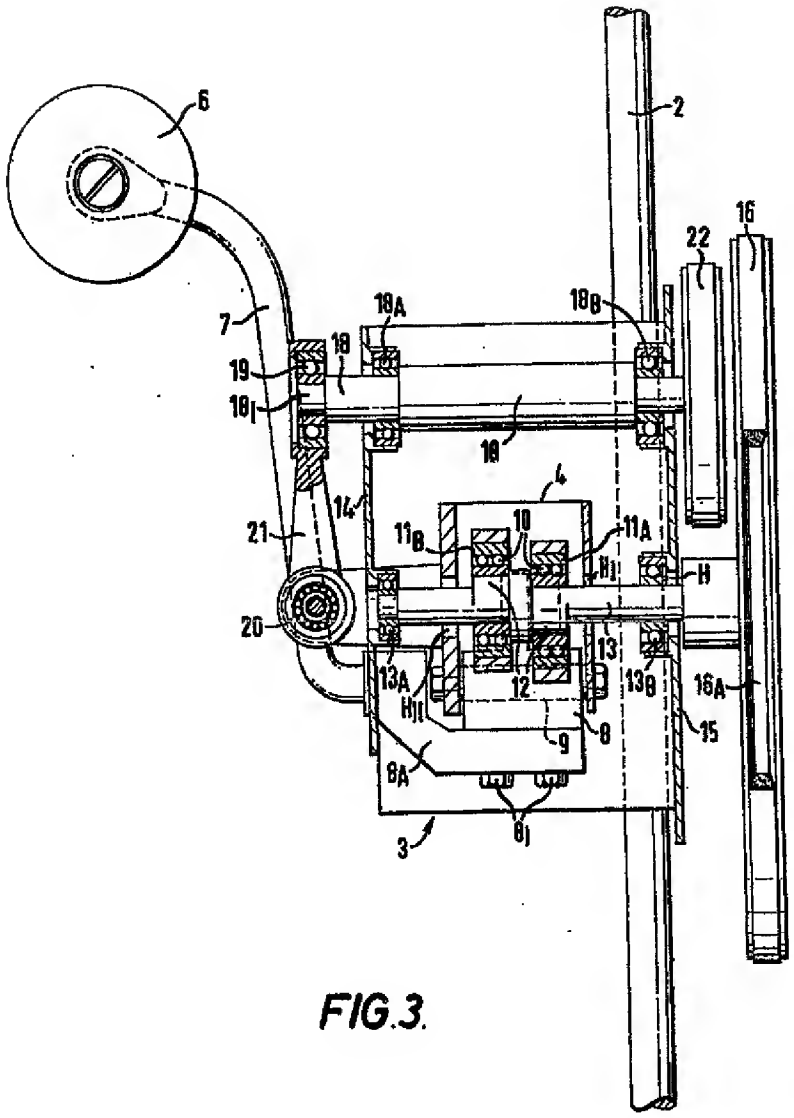
2
5
5I
22
23

FIG.2.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18
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14
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21
11B
10
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H11
9
8
15
8A
8
3

FIG.3.

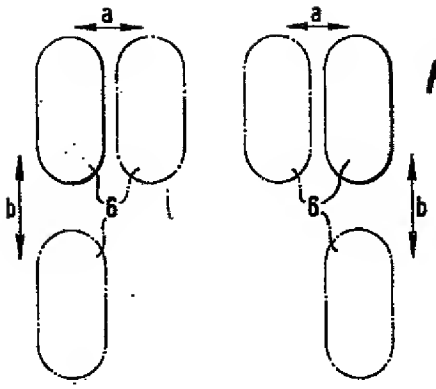

FIG.4.

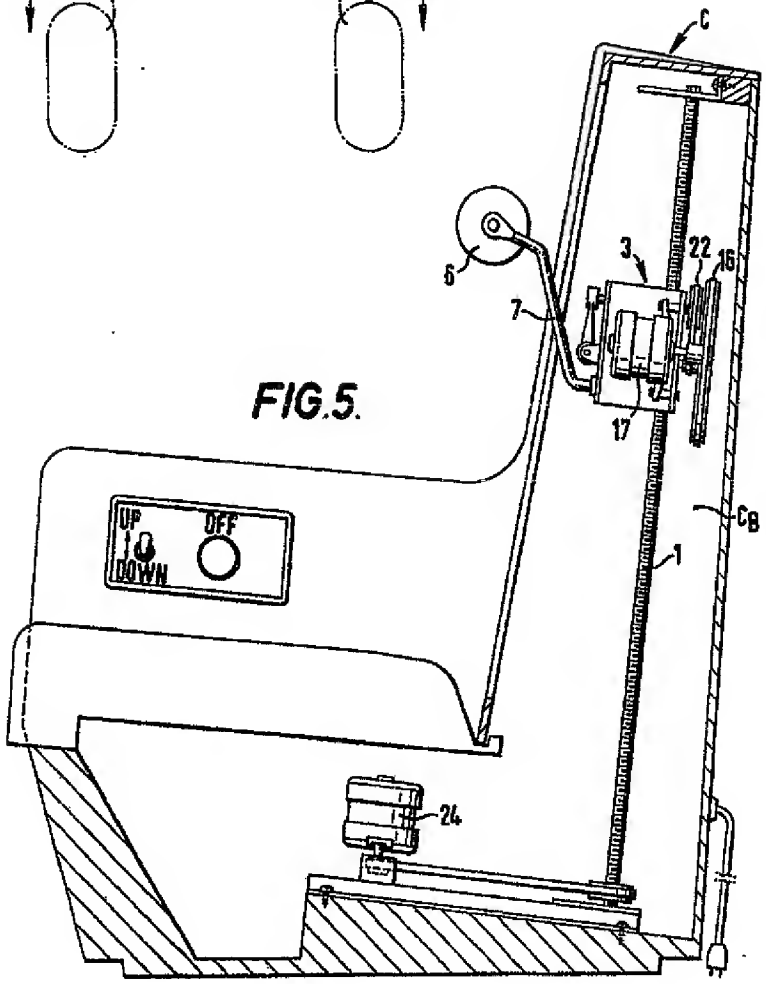

FIG.5.

1400473 COMPLETE SPECIFICATION
6 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 6

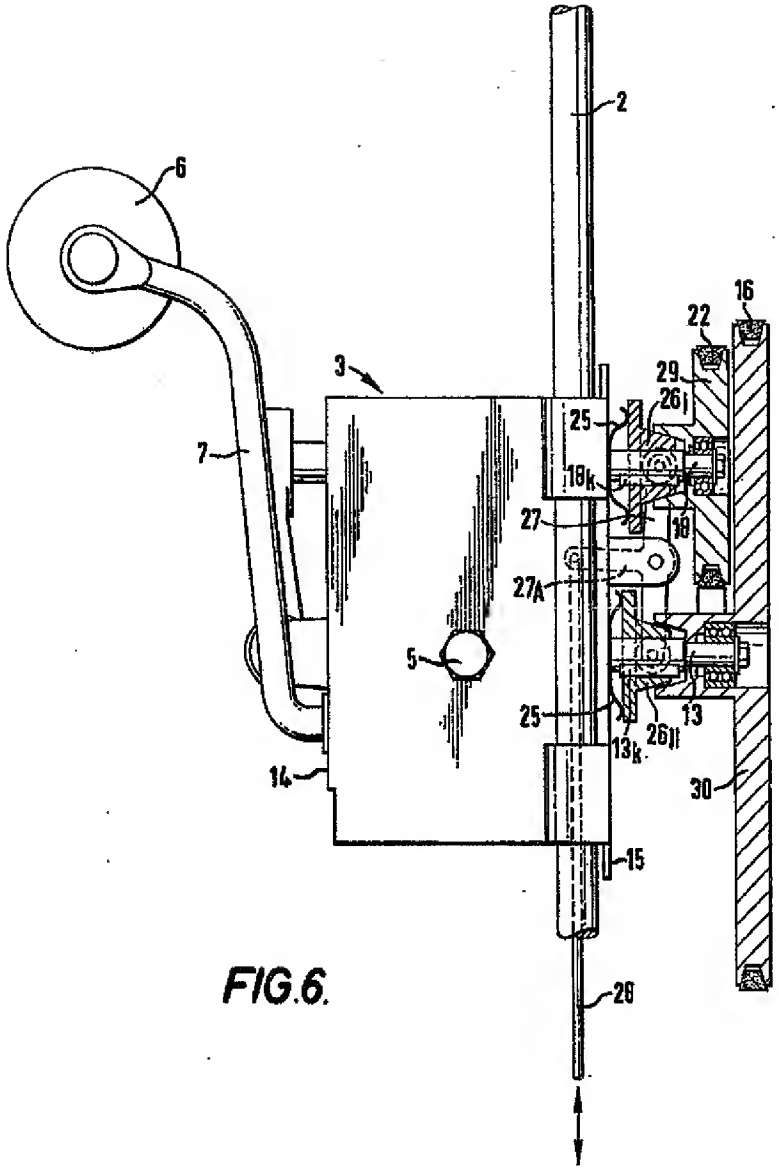

FIG.6.